

REMARKS/ARGUMENTS

Claims 22-29 have been rejected under 35 U.S.C. Section 103 as unpatentable over Vassallo, U.S. Patent Number 6,157,194 and Li, U.S. Patent Number 5,602,934. In response, claim 22 has been amended. Reconsideration of the claim in view of the amendments and the following remarks is respectfully requested.

Claim 22 recites a medical imaging system which includes a graphical object oriented application development system for developing pulse sequences which are downloaded to a pulse sequence server to drive RF and gradient coils to perform a medical imaging scan. As amended, the claim clarifies the graphical aspects of the system by reciting a graphical library of object-oriented components which can be visually assembled, e.g. essentially dragged and dropped together, to provide a pulse sequence which can be performed on the medical imaging system. The medical imaging system greatly increases the efficiency of the medical imaging system because operators of MRI systems are not typically proficient programmers. Furthermore, the system allows a user to view the pulse sequence to be executed, in a format which is familiar to the user. The present invention therefore provides a significant improvement in ease of use of scanning equipment.

Vassallo discloses an MRI control system employed on a personal computer system, and configured to control MRI system hardware directly. The system includes an image display subsystem (IDS), a patient database subsystem, and a scan control subsystem (column 3 lines 1 – 3), and is intended to replace “proprietary hardware based control systems” (see column 1, lines 22 – 41) with an off-the-shelf

personal computer, and is particularly directed to modifying the off-the-shelf system to display images. In particular, the specification notes the ability to interactively “sharpen, smooth, and contrast” images with a pointing device (column 1, lines 47 – 53), methods for providing a software control system in the place of custom chips for zooming and interpolation (column 4, lines 54 – 59), and providing a number of software modules for providing these display functions between column 5, line 7 and column 9, line 45. These functions are specifically described at column 5, lines 7 – 9 as part of the IDS (image display subsystem) which, as described in column 3, lines 4 – 10, allows the operator to view tomographic images on the display monitor”. Furthermore, there is no indication that these modules are graphical, or that they can be programmed visually.

A discussion of a “graphical user interface” is provided at column 4, lines 11 – 21. This interface, however, is noted to be part of a commercially available operating system (specifically Windows) which allows the system to use “advances in computer technology such as symmetric multiprocessing” and is not disclosed to provide visual programming or application development.

As described above, the system does include a “scan control subsystem” (column 3, lines 18 – 22) which both controls the pulse and reconstructs the image. As shown in Fig. 3, the “scan control” is provided in a command block including a header and associated scanner control data words. There is no discussion, however, as to how the scan is programmed, other than the brief statement at column 3, lines 41 – 45, which indicates that it is “contemplated” that the pulse sequence can be “drawn on the screen by the pulse programmer”. This statement ostensibly means that a

programmer, at some contemplated time in the future, might be able to draw a pulse waveform directly on screen. The specification clearly does not enable such a process, or even provide a minimal explanation of how such a process might be provided.

Li discloses a system for providing adaptive filtering of MRI image data. Li does not discuss any method for graphically programming scanning data on the MRI system.

Neither of the cited references, therefore, disclose or suggest an MRI system including library of graphic components or a visual assembler for assembling these components into a pulse sequence, as recited in claim 1. The vague references to “drawing” a pulse sequences is not equivalent to the method described here, nor is it enabled in the Vassallo reference. The remaining software discussions are all related to displaying images. The Applicants, therefore, submit that claim 22, as amended, and associated dependent claims 23 – 29, are patentably distinguished over the prior art, and respectfully request that a notice of allowance be issued.

Conclusion


In view of the foregoing amendments and arguments, the Applicants submit that the present invention is in condition for allowance, and respectfully request that a notice of allowance for claims 1 – 5, 8 – 16, and 18 - 21 be issued.

Appl. No. 09/721,233
Amdt. Dated January 28, 2005
Reply to Office Action of September 28, 2004

The Commissioner is hereby authorized to charge Deposit Account 07-0845 for Petition and Fee for One Month Extension of Time. No other fees are believed necessary. However, if any other fees are necessary, please charge Deposit Account 07-0845.

Respectfully submitted,

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